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Free Vibration Analysis of Porous Beams Via Numerical and Artificial Neural Network Approach

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The main purpose of this study is to analyze a porous beam, whose nodes are formed with a certain conditioned random function, with the numerical solution and Artificial Neural Network (ANN) approach. The free vibration frequencies of the porous beam were first calculated numerically. Then, the data of randomly generated beams were used to train the artificial intelligence module. In this context, the free vibration frequencies for any porous beam whose data is entered were predicted with the help of ANN and the obtained results were compared with numerical results. The truth is that this type of approach is thought to significantly reduce the processing load in determining the mechanical behavior of such structural elements, which we encounter in the most important fields of engineering such as mechanical engineering, civil engineering, and aviation industries. All results were visualized and explained with the help of 2D and 3D graphics.